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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,672	02/27/2004	Hiroshi Harada	30390-13	7562

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EXAMINER
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NGUYEN, LEON VIET Q

ART UNIT	PAPER NUMBER
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2611

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/22/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/789,672

Applicant(s)

HARADA ET AL.

Examiner

Leon-Viet Q. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Priority*

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Double Patenting*

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. **Claims 1 and 4 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6959052 in view of Shirakata (US6169751).**

Re claim 1, "said receiving unit receives a signal arriving through a transmission

path, as a reception signal" corresponds to "a reception section that receives a result of transmitting a transmission signal obtained by modulating a known signal and a data signal and outputs said result as a reception signal" of claim 1 in U.S. Patent No. 6959052.

"Said estimation unit estimates a transmission path characteristic" corresponds to "a prediction section that predicts a transmission characteristic" of claim 1 in U.S. Patent No. 6959052.

"Said equalizer/demodulator compensates for the delay signal with the estimated transmission path characteristic, demodulates a compensation result, and outputs a demodulation result as a transmission signal" corresponds to "a compensation section that compensates that portion of said reception signal which corresponds to said data signal and which has not been compensated yet, using a predicted portion of said transmission characteristic, and outputs said compensated portion as a compensated data signal" and "a demodulation section that demodulates said compensated data signal and outputs said demodulated signal as a demodulated data signal" of claim 1 in U.S. Patent No. 6959052.

"Said replica unit compensates for the reception signal with the estimated transmission path characteristic, demodulates a compensation result, modulates a demodulation result, and outputs a modulation result as a replica signal" corresponds to "a compensation section that compensates that portion of said reception signal which corresponds to said data signal and which has not been compensated yet, using a predicted portion of said transmission characteristic, and outputs said compensated

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portion as a compensated data signal", "a demodulation section that demodulates said compensated data signal and outputs said demodulated signal as a demodulated data signal" and "a modulation section that modulates said demodulated data signal and outputs said modulated signal as a modulated data signal" of claim 1 in U.S. Patent No. 6959052. As disclosed on col. 10 lines 22-28 in U.S. Patent No. 6959052, the replica is formed from the modulation of the demodulated signal.

"Said estimation unit estimates a transmission path characteristic by comparing the reception signal with the replica signal" corresponds to "whereby said prediction section (a) compares that portion of said reception signal which corresponds to said known signal with a result of modulating said known signal and compares that portion of said reception signal which corresponds to said data signal with that portion of said modulated data signal which corresponds to said data signal to acquire a time series of comparison results" of claim 1 in U.S. Patent No. 6959052.

U.S. Patent No. 6959052 fails to teach a delay unit, said delay unit outputs a delay signal which is obtained by delaying the reception signal by a predetermined delay time wherein the predetermined delay time is equal to or smaller than a time required for processes by said replica unit and said estimation unit. However Shirakata teaches providing a plurality of delayers (col. 3 line 61) which delay a signal by a predetermined time (col. 3 lines 56-63) where the range is not greater than one cycle of a clock signal (col. 3 lines 56-59).

Therefore taking the combined teachings of the background and Shirakata as a whole, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to incorporate the delays of Shirakata into the receiving device of the background. The motivation to combine Shirakata and the background would be to properly determine the correct synchronizing symbol promptly (col. 2 lines 62-63).

Re claim 4, which depends on claim 1, "a receiving device wherein said estimation unit averages a time series of characteristics obtained as a result of the comparing by a predetermined time length" corresponds to "(b) replaces a value in said time series of comparison results which satisfies a predetermined exclusion condition with an old value of said time series of comparison results, (c) averages a time series of comparison results resulting from that replacement" of claim 1 in U.S. Patent No. 6959052.

"Regards the time series of characteristics obtained as a result of the averaging as the transmission path characteristic" corresponds to "(d) lets a result of that averaging be a predicted transmission characteristic" of claim 1 in U.S. Patent No. 6959052.

Therefore taking the combined teachings of the background and Shirakata as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the delays of Shirakata into the receiving device of the background. The motivation to combine Shirakata and the background would be to properly determine the correct synchronizing symbol promptly (col. 2 lines 62-63).

A non-statutory obviousness-type double patenting rejection is also made to claims 6 and 9, which corresponds to claim 13 of U.S. Patent No. 6959052 in a similar fashion as to the rejection of claims 1 and 4 above.

***Claim Rejections - 35 USC § 101***

5. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. **Claims 11-12 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.**

Claims 11-12 pertains solely to a program product that is not embodied in any computer-readable media.

*"Similarly, computer programs claimed as computer listings per se, i.e., the descriptions or expressions of the programs, are not physical "things." They are neither computer components nor statutory processes, as they are not "acts" being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized. In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32F.3d at*

1583-84, 32 USPQ2d at 1035. See Interim Guidelines on 35 USC 101, Annex IV (a):

Functional Descriptive Material.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-3, 6-8, and 11-12 is rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's description of the related art (hereby referred to as background) and further in view of Shirakata (US6169751).**

Re claim 1, the background teaches a receiving device comprising a receiving unit (¶0005, a receiving device), an estimation unit (¶0005, the receiving device estimates the transmission path characteristic), an equalizer/demodulator (¶0005, the receiving device equalizes a data signal), and a replica unit (¶0010, generation of a replica), wherein:

said receiving unit receives a signal arriving through a transmission path (¶0005, one of ordinary skill in the art would find it necessary for a receiving device to receive a signal through the transmission path), as a reception signal;

said estimation unit estimates a transmission path characteristic (¶0005, receiving device estimates the next transmission path characteristic);



said equalizer/demodulator compensates for the delay signal with the estimated transmission path characteristic (¶0010, an obtained transmission path characteristic is used for equalization of a received signal which arrives later), demodulates a compensation result (it is well known in the art that a receiver must have a demodulator to extract information from a signal), and outputs a demodulation result as a transmission signal;

said replica unit (¶0010, generation of a replica must be performed in some device) compensates for the reception signal with the estimated transmission path characteristic, demodulates a compensation result (it is well known in the art that a receiver must have a demodulator to extract information from a signal), modulates a demodulation result (¶0005, the replica signal is the modulated signal and it is necessary for modulation to be performed to obtain a modulated signal), and outputs a modulation result as a replica signal (¶0005, the modulated signal referred to as replica);

said estimation unit estimates a transmission path characteristic by comparing the reception signal with the replica signal (¶0005, receiving device estimates the first transmission patch characteristic by comparing a received signal with the known signal or its modulated signal wherein the modulated signal is referred to as replica); and

The background fails to teach a delay unit, said delay unit outputs a delay signal which is obtained by delaying the reception signal by a predetermined delay time wherein the predetermined delay time is equal to or smaller than a time required for processes by said replica unit and said estimation unit. However Shirakata teaches

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providing a plurality of delayers (col. 3 line 61) which delay a signal by a predetermined time (col. 3 lines 56-63) where the range is not greater than one cycle of a clock signal (col. 3 lines 56-59).

Therefore taking the combined teachings of the background and Shirakata as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the delayers of Shirakata into the receiving device of the background. The motivation to combine Shirakata and the background would be to properly determine the correct synchronizing symbol promptly (col. 2 lines 62-63).

Re claim 2, the modified invention of Shirakata and the background teaches a receiving device wherein the predetermined delay time is equal to or smaller than a time required for processes by said replica unit and said estimation unit (col. 3 lines 56-59 in Shirakata, one of ordinary skill would have found it the processes of the replica unit and estimation unit be performed in one clock cycle and the predetermined range is less than or equal to that).

Re claim 3, the modified invention of Shirakata and the background teaches a receiving device wherein said estimation unit estimates a transmission path characteristic (§0005 in the background, receiving device estimates the first transmission path characteristic) by "comparing a signal obtained by delaying the reception signal by the predetermined delay time with the replica signal" (§0005 and §0010 in the background. The receiving device estimates the next transmission path

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characteristic by comparing the replica signal with the actually received signal.

Although not explicitly stated, the background suggests that the received signal could arrive later or be delayed. Therefore one of ordinary skill in the art would have found it obvious to compare the replica signal with the delayed version of the received signal) instead of by "comparing the reception signal with the replica signal".

Re claim 6, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 1. It would be necessary to have a method for using the receiving device as claimed in claim 1.

Re claim 7, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 2.

Re claim 8, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 3.

Re claim 11, it would be obvious and necessitated to have a program product to function the device of claim 1. Furthermore, DSP's, FPGA's and ASIC's are well known devices in the art.

Re claim 12, it would be obvious and necessitated to have a program product to execute the method of claim 6. Furthermore, DSP's, FPGA's and ASIC's are well known devices in the art.

**3. Claims 4 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's description of the related art (hereby referred to as background) and Shirakata (US20020141495) as applied to claims 1 and 6 above, and further in view of Harada et al (US20020126774).**

Re claim 4, the modified invention of Shirakata and the background fails to teach a receiving device wherein said estimation unit averages a time series of characteristics obtained as a result of the comparing by a predetermined time length, and regards the time series of characteristics obtained as a result of the averaging as the transmission path characteristic. However Harada teaches a receiving device wherein said estimation unit averages a time series of characteristics (¶0045) obtained as a result of the comparing by a predetermined time length (¶0043), and regards the time series of characteristics obtained as a result of the averaging as the transmission path characteristic (¶0046).

Therefore taking the modified teachings of the background and Shirakata with Harada as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the estimation unit of Harada into the receiving device of Shirakata and the background. The motivation to combine Harada,

Shirakata, and the background would be to compensate for reception signals (§0010 in Harada).

Re claim 9, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 4.

**4. Claims 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's description of the related art (hereby referred to as background) and Shirakata (US20020141495) as applied to claims 1 and 6 above, and further in view of Kroeger (US20030108123).**

Re claim 5, the modified invention of Shirakata and the background teaches a receiving device wherein:

said delay unit (col. 3 line 61 in Shirakata, the delayers), said estimation unit (§0005 in the background, the receiving device estimates the transmission path characteristic), said equalizer/demodulator (§0005 in the background, the receiving device equalizes a data signal), and said replica unit (§0010 in the background, generation of a replica) perform their processes for each carrier frequency (§0004 in the background).

However the modified invention fails to teach a receiving device wherein said receiving device uses orthogonal frequency division multiplex. Kroeger teaches using a OFDM scheme (§0015).

Therefore taking the modified teachings of the background and Shirakata with Kroeger as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of OFDM of Kroeger into the receiving device of Shirakata and the background. The motivation to combine Kroeger, Shirakata, and the background would be to eliminate the need to isolate DAB digital carriers from each other via filtering and minimize interference (¶0015).

Re claim 10, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 5.


### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon-Viet Q. Nguyen whose telephone number is 571-270-1185. The examiner can normally be reached on monday-friday, alternate friday off, 7:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Leon-Viet Nguyen/

  
DAVID C. PAYNE  
SUPERVISORY PATENT EXAMINER